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67 Locust St.

Paper March 1828

an excellent Essay - deserving of
high Commendation - both in
respect to the Pharmacological Preparation
of Opium - & also in that of its practical
employment
on

Opium.

by

Edward Staples.

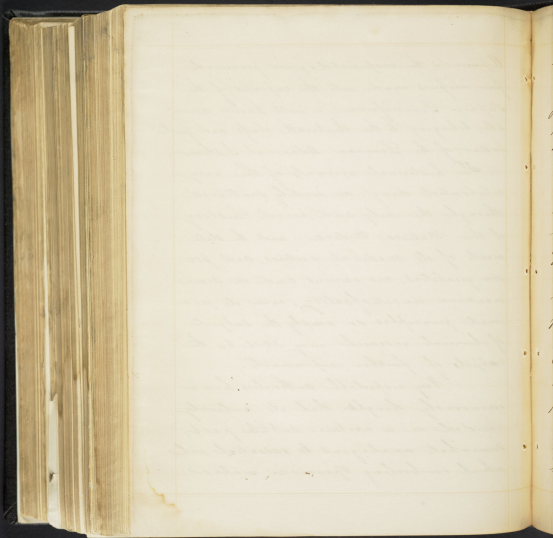
John Smith 1871

Thomas Smith

Opium is the inspissated juice procured from incisions made into the capsules of the *Papaver Somniferum*, a well known annual, belonging to the thirtieth class and first order, of the Linnean Botanical System.

The historical accounts of this very celebrated drug, are widely scattered through the early and recent history of the *Materia Medica*; and the statements of its medical virtues, and poisonous qualities, are various, and in some measure unsatisfactory; even its proximate principles so amply the subject of chemical research may still be the objects of further experiments.

Very respectable authorities have erroneously thought, that its activity resided in a certain subtle part, somewhat analogous to essential oils, which on boiling Opium in water



they relate arises and may be con-
sidered, which in doses of a few
grains, has so much activity as to
produce death in dogs unaffected by
the common Opium in drachm doses.

Newman has asserted that he knew
a preparation of Opium, capable of pro-
ducing stupor, without its internal
use, he fancied its action resembled the
fumes of charcoal and like carbonic
acid gas its baneful influence could
be extended to a whole roomfull of
persons.

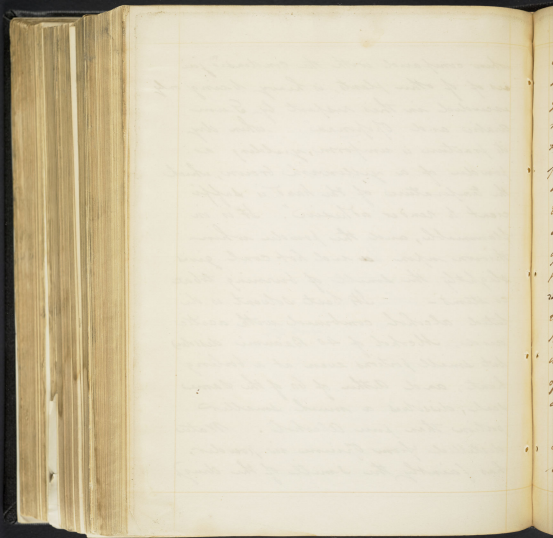
Our supplies of
Opium are obtained from India and ^{which} Turkey
the latter is deservedly most
esteemed. Turkey Opium has a
peculiar, strong, heavy, narcotic
odour, and a bitter taste which is
accompanied with a sense of acrid
heat, or biting on the tongue and lips



if the opium be well chewed; and if it be long left in the mouth of a person unaccustomed to chew it, blistering is produced." (The peculiar odour, narcotic smell, and the adhesive qualities of Opium, are peculiarly affected by subjecting it to ether, in the process devised for making de narcotised Opium, the two first are nearly removed, and the latter essentially modified; and the powder when thrown upon a red hot coal gives off fumes more resembling animal substances burning; and like the smell of tobacco stems under similar circumstances)

"The colour of Turkey Opium when good is of a reddish brown or fawn colour, its texture compact and uniform. Its specific gravity 1.336 which

when compared with the condensed juices of other plants, is heavy being only excelled in this respect by Gum Arabic and Opoponax. When dry its fracture is uniform, yielding a powder of a yellowish brown, which the temperature of the hand is sufficient to render adhesive. It is inflammable, and the powder when thrown upon ~~red~~ hot coal gives slightly the smell of burning tobacco stems - Its best solvent is diluted alcohol combined with acetic acid, Alcohol of 40 ^{about 27°} Beaumé dissolves but small portions even at a boiling heat, and Alcohol of 60 of the same scale, dissolves a much smaller portion than pure Alcohol. Water distilled from Opium in powder, has faintly the smell of the drug,

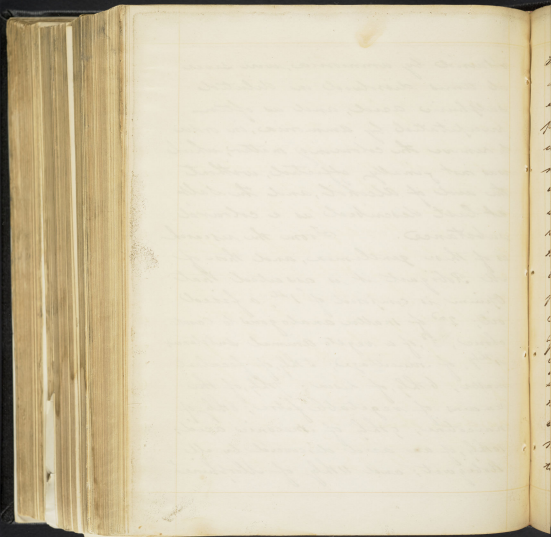


alcohol of 40 distilled under the same circumstances, is unchanged and without odour, when however, ammonia is combined with the water, or alcohol, the odour is peculiar, and perceptible in both, the watery, and spirituous distillations. In 1803 M. Desorme described a salt obtained from opium, which has since been supposed to be the meconate of morphia, more recently asserted by M. Robiquet to be narcotined. M. Seguin in 1804, discovered a crystalline body in opium, and described most of its properties without having been aware of its alkaline qualities.

M. Sertuerner first announced in 1817 Morphin as an alkaline substance, his precipitates

obtained by ammonia, were several times dissolved in diluted sulphuric acid, and as often precipitated by ammonia, in order to remove the colouring matter, which was not finally effected, without the aid of alcohol, and the salt at last described as a coloured substance.

From the researches of these gentlemen, and those of M. Robiquet it is asserted that Opium is composed of "1st, a fixed oil; 2nd of matter analogous to castor oil; 3rd, of a vegetable animal substance; 4th, of mucilage; 5th, of feculent matter; 6th, of resin; 7th, of the remains of vegetable fibre; 8th, of narcotics; 9th, of meconic acid; 10th, of an acid discovered by M. Robiquet; and 11th of Morphine"



The several ingredients composing Opium are supposed to be mixed with the exception of Narcotine and Morphine. The meconic acid is only interesting in consequence of its connection with Morphine existing in Opium as the solvent of that substance.

Narcotine may readily be obtained from Opium, by the repeated use of Aether, which dissolves besides that substance a portion of the matter analogous to Castoreum, by removing the Aether by distillation, acting upon the mass left in the retort with strong alcohol, suffering crystals to form, washing them with oil of turpentine, and redissolving them in strong alcohol, pure narcotine may be obtained in crystals, of nearly a snow white -

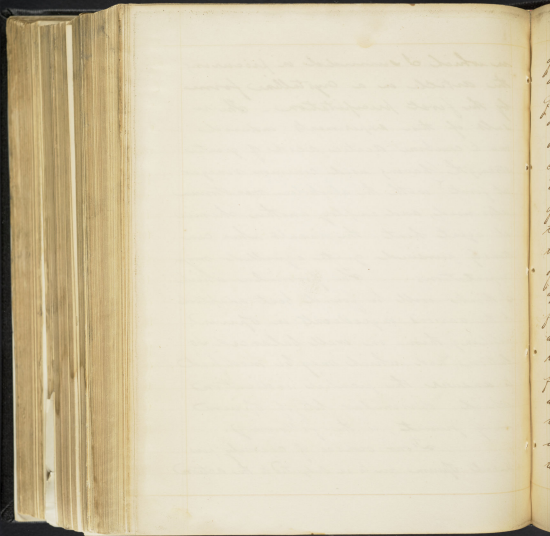
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The quantity of caoutchouc, in opium, is inconsiderable, when compared with many vegetable substances. Seven hundred and sixty one grains, were subjected to eight times the bulk of Oil of turpentine, for seven ✓ al days, at a temperature above six ° cent, only sixty four grains were dissolved. The Marseilline, when produced from the same Opium was destitute of the substance resembling caoutchouc always produced when ether is the first solvent. Of the most important substance obtained from Opium Morphia. Having tried with unsatisfactory results the processes detailed by Magendie and others I have endeavoured to form a formula founded upon experiments made upon a small scale

It is a very common error to suppose that the
ancient world was a uniform plain. In fact
it was a world of mountains and valleys, of
rivers and lakes, of forests and fields. The
ancient world was a world of contrasts, of
riches and poverty, of power and weakness.
The ancient world was a world of mystery,
of wonder, of awe. It was a world that
inspired the imagination, that stirred the
heart, that challenged the mind. It was a
world that has left behind it a legacy of
art, of literature, of science, of philosophy.
The ancient world was a world that has
shaped the course of human history, that
has given us the foundations of our
civilization. It was a world that has
taught us the value of knowledge, the
importance of justice, the meaning of
life. The ancient world was a world that
has inspired us to strive for a better
future, to seek for truth, to reach for
the stars.

in which I succeeded in procuring the article in a crystalline form by the first precipitation - The result of these experiments induced me to combine acetic acid of greater strength (having used common vinegar at first) with the alcoholic menstruum also used, and employ another chemical agent heat, the result when cautiously pursued quite equalled my expectations. The formulae which I think will be found best adapted to the various ingredients in Opium, holding them in well balanced solution, and which may be modified to answer the peculiar indication which dissimilar lots of Opium may present, is the following.

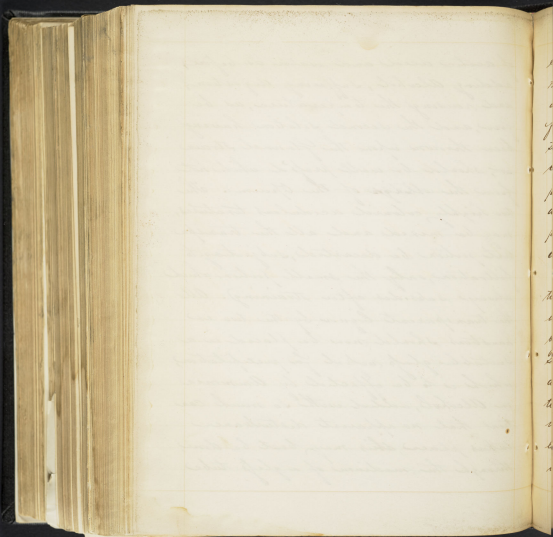
Four ounces of coarsely powdered Opium are to be subjected to the action



of three ounces of strong acetic, and
and an equal quantity of pure water,
for twenty four hours in a temperature
over 70° Fahrenheit, after which eight
ounces of Alcohol of 35° Beaume (spe-
cific gravity about 835) are to be ad-
ded, and a further digestion sufficed
of six or eight hours, in a similar
temperature, the heat of the solution
then to be gradually raised by means
of a water bath to 160° Farenht., and
after having remained at that heat
for a short time to be thrown upon
a flannel strainer, (here the appa-
ratus contrived by professor Ware for
facilitating filtration by heat as well
as in other stages of this process may
be used with great advantage) the
undissolved portion of Opium, is then
to be subjected to a similar portion

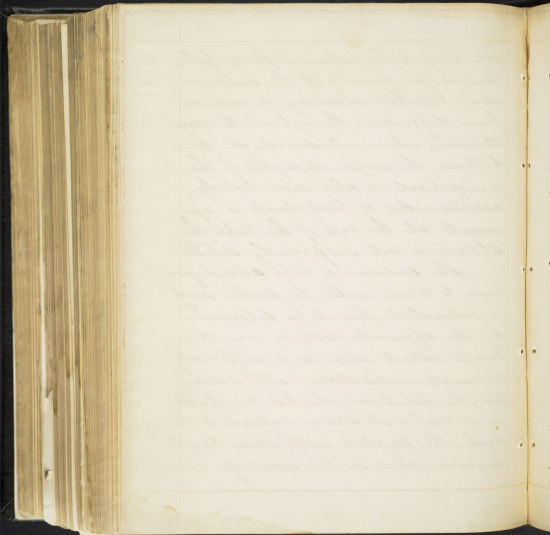
1791
The first of the year was a
very cold one, and the
winter was a very severe
one. The snow was very
deep, and the wind was
very strong. The people
were very much
concerned, and the
government was very
anxious to see that
the people were
well provided for.
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very cold one, and the
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anxious to see that
the people were
well provided for.

of acetic acid and water as before,
adding Alcohol, suffering digestion,
and raising the temperature, as be-
fore, and the second solution having
been thrown upon the Glannel Strain-
er, should be well pressed while hot
from the edges of the Opium. The
two highly coloured acidulous tinctures,
may be mixed and all the transpa-
rent portion be decanted, subjecting to
filtration, only the small portion which
always subsides after straining. All
the transparent liquors by the two ex-
haustions should now be placed in a
suitable glass vessel for precipitation,
which is to be effected by Ammonia
in Alcohol, added with so much cae-
tion that no apparent disturbance
takes place, this may best be done
through the medium of a glass tube



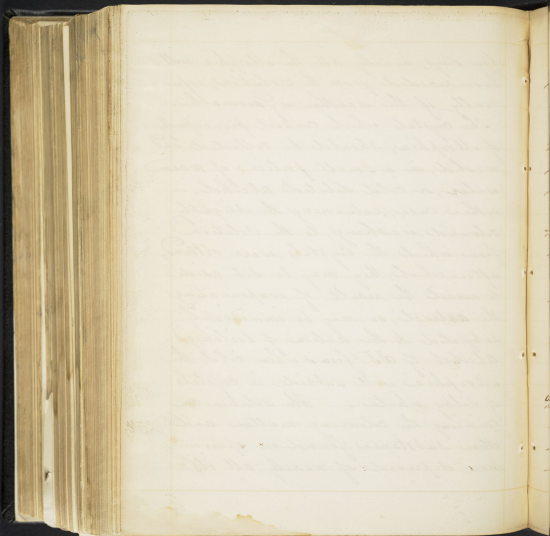
extending to the bottom of the vessel,
the specific gravity of the ammoni-
ated Alcohol ensuring its more uni-
form diffusion throughout the men-
struum, when introduced at the
bottom, the proper strength of the
precipitant is also more readily
ascertained, if turbidness is ap-
parent at the end of the tube the
alkali is not sufficiently diluted.

The ammonia is to be added from
time to time until the acetic acid
is saturated, this to be determined
by the appropriate test or even the
small relief upon as a sufficiently
accurate indication; after satura-
tion, the solution should be placed
in a cool situation, exposed to the
light, the crystals will soon begin
to form, and in the course of a



few days, nearly all the Morphia will have receded from the solution, especially if the weather is favourable.

The crystals which consist principally of Morphia, should be collected and washed, in a small portion of warm water, or cold diluted alcohol, in either case, returning the slightly coloured washing, to the solution from which the Crystals were obtained, after which they may be set aside to await the result of evaporating the extract, or may be immediately subjected to the action of boiling alcohol of 35 from which when cold the Morphia will subside in crystals of silky white. The solution containing the colouring matter and other substances found in opium now deprived of nearly all its



Morphia, may be submitted to distillation in a water bath, permitting the liquid to cool when reduced one third, in order that more crystals may form should Morphia still remain in solution, and it may be well to suffer the liquid to cool at another point of distillation, for the same purpose, it will however, be found that nearly all the morphia recedes from the first solution in the first precipitation.

The residue of the solution, may be evaporated in a water bath, and the extract of Opium deprived of allopria be formed. The following appears to be the rationale of the process. Opium is presented in solution, in its best solvent diluted alcohol, the power of which,

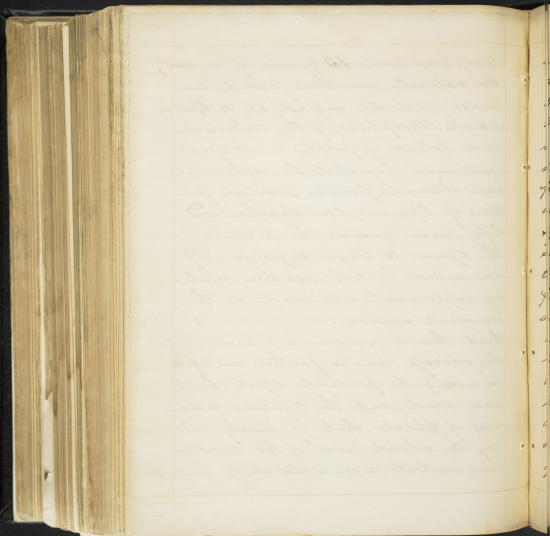
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is much exalted by heat and acetic acid, (from which pure aqua ammonia, would produce the precipitation of several of the ingredients of opium in a very imperfect manner) combined with alcohol the most soluble portions are still retained in the solution by its aid while the uncombined Morphia, but little soluble in pure alcohol and less so when colouring matter is present, recedes gradually from the solution.

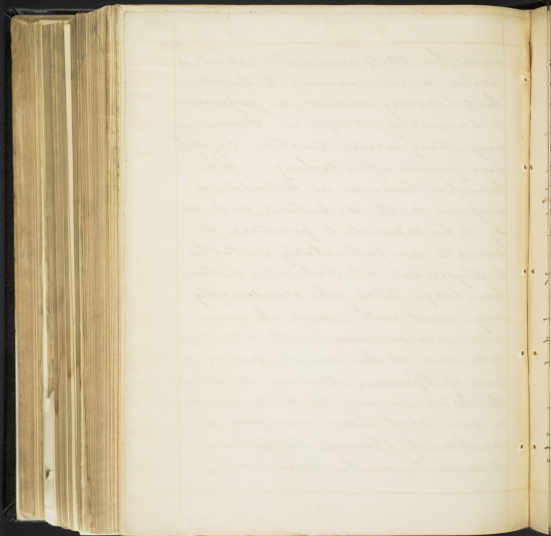
Experimental illustration. Four ounces of coarsely powdered opium was twice acted upon by the heated menstruum in the manner detailed on the first trial 868 grains were dissolved, on the second 350 grains from each separately, Morphia was obtained, the result 80 grains of pure

Morphia and 10 grains of impure
An extract was then formed con-
taining all the ingredients of Opium,
except Morphia, of the consistence
and colour of pitch. A young
gentleman repeated the experiment,
and obtained from a similar por-
tion of Opium, one drachm and
fifty nine grains, he submitted
the Opium to longer digestion, and
was aided by cool weather while
my experiment was made in the
warmest season.

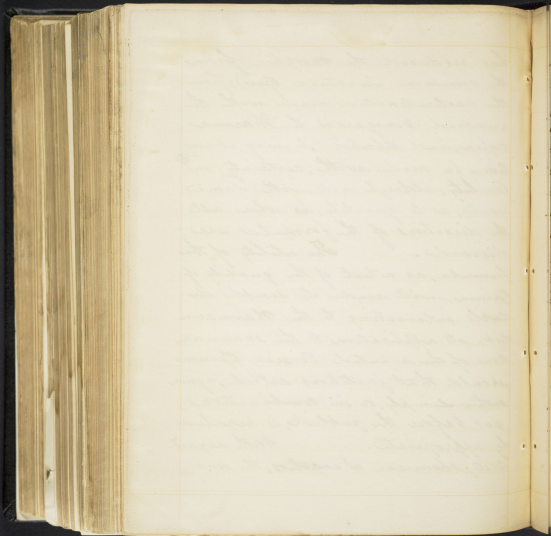
I think there is reason to believe, that
the process can be further modified,
by using the powerful agents heat
and acid, and the cautious addi-
tions of Alkali, that by merely redu-
cing the solvent power of the menstru-
um, without even saturating the



acid, the Morphia will recede,
acetic acid seeming to dissolve
the colouring matter, in preference
to saturating Morphia. From a
very strong acetic tincture crystals
have formed after cooling. The
formula however as detailed, is
uniform in its productions, and easily
to be reduced to practice; it
seems to me particularly suitable
to Physicians situated at a distance
from large Cities, who occasionally
may meet with persons, who from
idiosyncrasy cannot with advantage
take any of the usual prepara-
tions of Opium, following its details
the morphia may be produced in
a very short time, even from a
drachm of Opium, (the professor
of chemistry in the University,



has produced the morphia from the common Sinctura (Gris); from the acetic tincture made with the purified vinegar of the Pharmacopoeia, and alcohol it may at any time be made with certainty and facility, although not with same result, as to quantity, as when all the directions of the formula are observed. The utility of the formula, as a test of the quality of Opium, will render its simple details interesting to the Pharmacist: its application to the examination of the reputed Persian Opium should that factitious article, again either simply, or in combination get before the public, is peculiarly appropriate. With regard to its chemical characters, it may



be objected, that the expense of using alcohol as a solvent, in the first place, will include its general adoption; this I think will be found incorrect when it is considered that every success known renders alcohol necessary to remove the coloring matter from the precipitate, and this is accomplished with so much difficulty that professor Thompson recommends, the use of charcoal for the purpose, the Morphia will inevitably be entangled in this substance and require boiling alcohol again and again to remove it. If all the various washings, and solutions in alcohol, which succeed the precipitation, by the usual

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methods, are considered the bal-
ance will scarcely preponder-
ate against its use in the first
instance.

The quantity of
ammonia, will be less than is
usually required, and the portion
beyond saturation will be re-
claimed in the alcohol distilled
from the extract.

In the
formula of M. Robiquet, it is
recommended to make an aque-
ous extract, after the magnesi-
an precip^{ts}, asserting that some
of the Morphia is still retained
in solution, if the Opium is dif-
fused through sufficient water to
hold all the Morphia in solution
this must be a tedious and expen-
sive process, and attended with some
risk of impairing the Safford var

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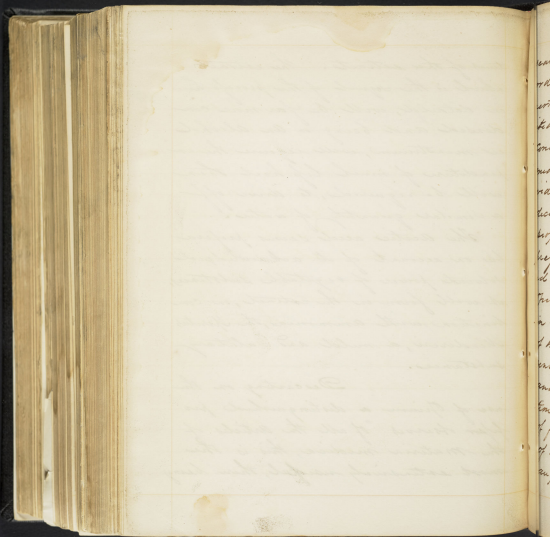
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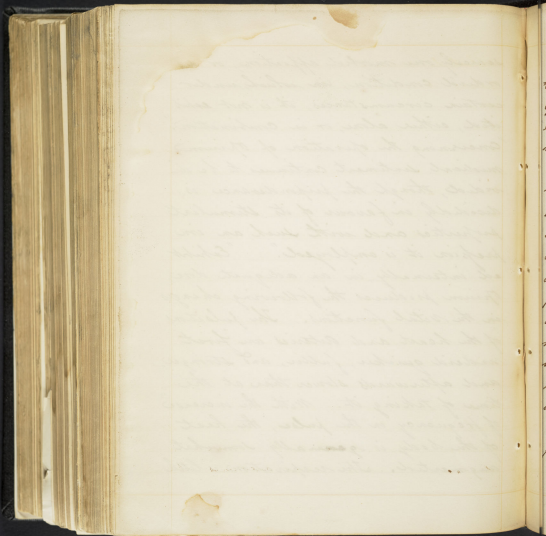
times of the extract. The extract
which is the result of the process here
in detail, will be far more con-
densed, ^{in the first place} and being in an alcohol
is menstruum, will require the ex-
penditure of much less heat than
will be required, to drive off
a similar quantity of water.

The Acetic acid seems prefera-
ble on account of its acknowledged
solvent power of vegetable substances,
it will form in the extract, in com-
bination with ammonia, the Spiritus
Mindereri, a mild and salutary
substance.

Descarting on the
use of Opium a distinguished pro-
fessor observes "of all the articles of
the Materia medica, this is the
most extensively useful, there being



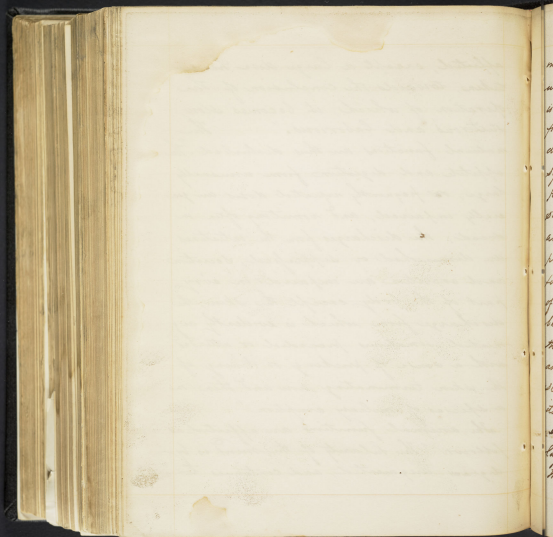
scarcely one morbid affection, or dis-
ordered condition, in which, under
certain circumstances, it is not exhib-
ited, either alone, or in combination."
"Concerning the operation of Opium,
medical sentiment continues to be di-
vided, though the preponderance is
decidedly in favour of its stimulant
properties and with such an im-
pulsion it is employed." "Exhibit-
ed internally, in an adequate dose,
Opium produces the following changes
in the vital functions. The pulsations
of the heart and Arteries are first
rendered quicker, fuller, and stronger,
and afterwards slower than at the
time of taking it. With the increase
of frequency in the pulse, the heat
of the body is generally somewhat
augmented. The respiration is little



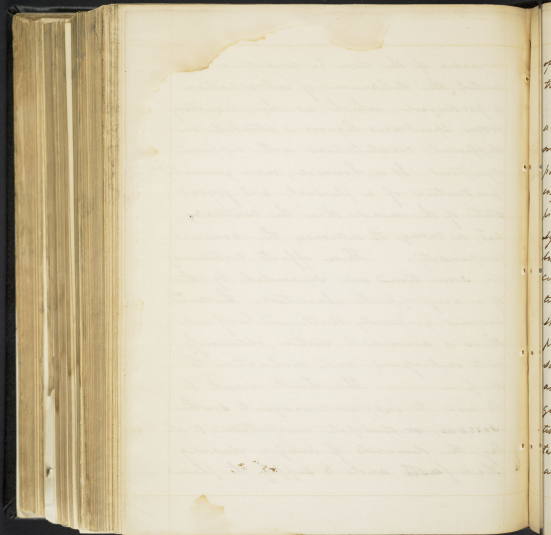
affected, except a large dose has been taken, towards the conclusion of the operation of which, it becomes slow, stultorous and laborious."

The natural functions are thus disturbed. "The appetite and digestion from unusually large, or frequently repeated doses are generally impaired, and vomiting often induced; the discharges from the intestines are diminished or suppressed, secretion and excretion are impaired in every part of the body except the skin, the discharge from which is evidently augmented, sometimes preceded or attended with a sense of pricking or itching of the skin terminating now and then in a species of miliary eruption"

The animal functions are affected as follows "The hilarity of the mind is by degrees augmented, and continues to



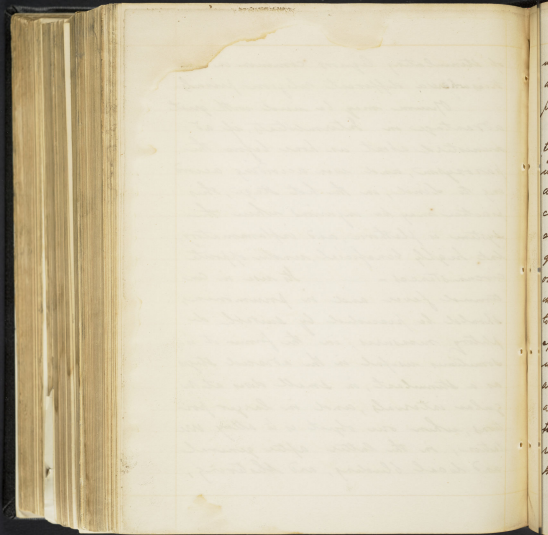
increase if the dose be considerable,
until the delirium of intoxication
is produced, which, as when resulting
from spirituous liquors is attended in
different constitutions with different
symptoms. It is, however, more generally
productive of a pleasant and joyous
state of the mind than the contrary,
and, in many, it increases the venereal
propensity. These effects continuing
for some time are succeeded by others
of a very opposite character - the mind
becomes gradually dull, and languid
there is aversion to motion, obtuseness
as to impressions, and inclination to
sleep - The Turks resort to
its use to inspire courage, to soothe
~~sorrow~~, or dissipate misfortune, to al-
leviate the demands of hunger during
their fasts, and to supply the place



of stimulating liquors common in countries where a different religion prevails.

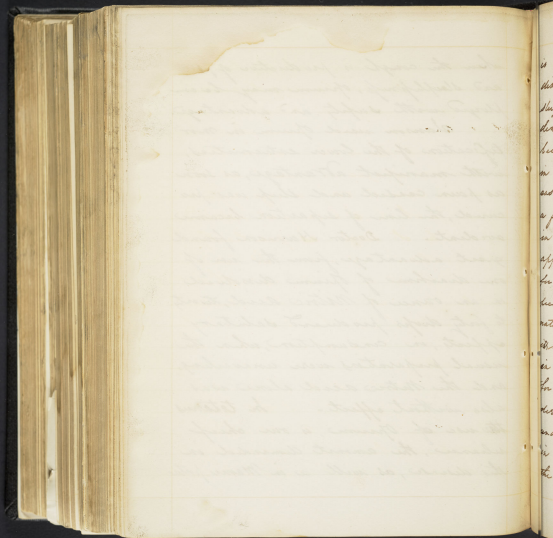
Opium may be used with great advantage in Intermittents, if administered about an hour before the paroxysm, and even according according to Lind, in the hot stage, this practice may be injurious when the system is plethoric, and inflammatory, but highly beneficial, under opposite circumstances -

Its use in continued fever and in pneumonia, should be preceded by suitable depleting measures; in the former it is sometimes useful in the advanced stages as a stimulant, in small doses at regular intervals, and in larger portions, when our object is to allay irritation; in the latter after general and local bleeding, and blistering,



when the cough is productive of pain and sleeplessness, Opium may be employed with safety and advantage.

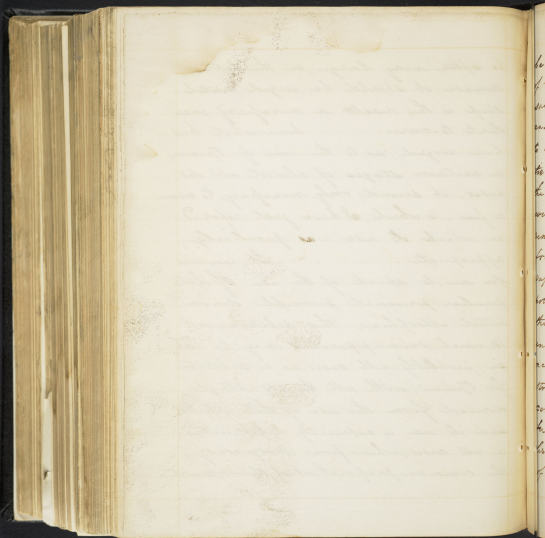
Sanson used Opium in mortification of the lower extremities, with manifest advantage, as soon as pain ceased and sleep was procured, the line of separation became evident. Doctor Harrison found great advantage, from the use of one drachm of Opium dissolved in an ounce of Nitric acid, twenty to forty drops produced salutary effects, in consumption, when the usual preparations were unavailing, and the Nitric acid alone was also without effect. In tetanus the use of Opium, is our chief reliance, the amount demanded in this disease, as well as in Mania potus



is often very large, in the latter disease it should be urged until sleep is the result a necessary ingredient to cure.

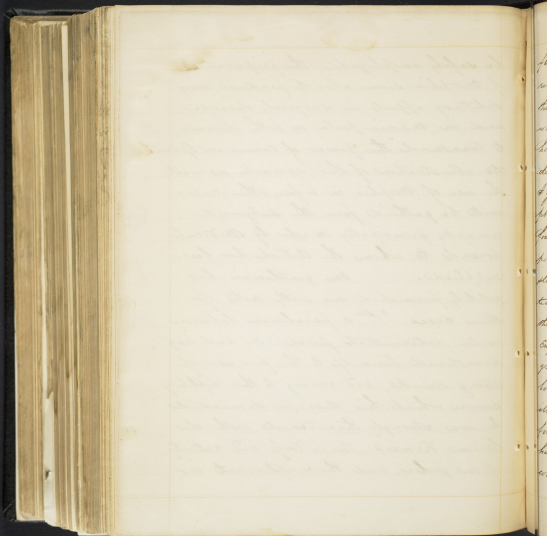
Since what has been urged, as to the use of Opium, in certain stages of almost all diseases, it seemed only necessary to name a few, to which I have just referred, in which its use was peculiarly appropriate.

It remains for me, to speak of the use of that peculiar proximate principle denominated Morphia, this substance and its usual saline preparations may be used in probably all cases as a substitute for Opium, with all the advantage derived from the use of that article; and its use is especially appropriate in all cases, when from idiosyncrasy, the common preparations of Opium, cannot

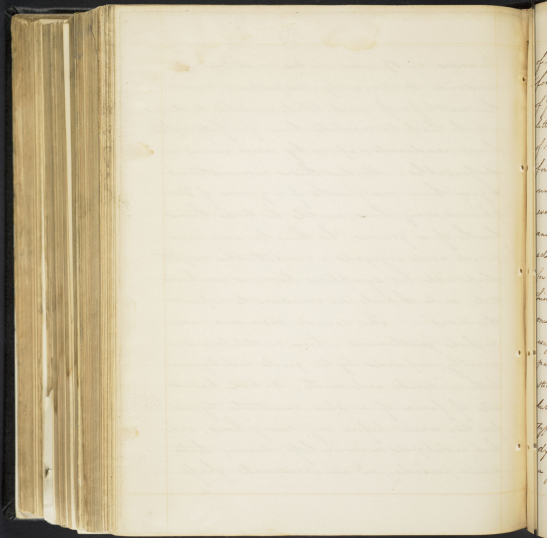


be safely employed. the preparations
of Morphia seem also to produce very
solitary effects in surgical disease
and in mania potius in both disease
to transcend the power of common Opium
the illustration of this remark as well
the use of Morphia in a few other cases
will be gathered from the subjoined
remarks principally made by Medical
friends to whom the Article has been
supplied.

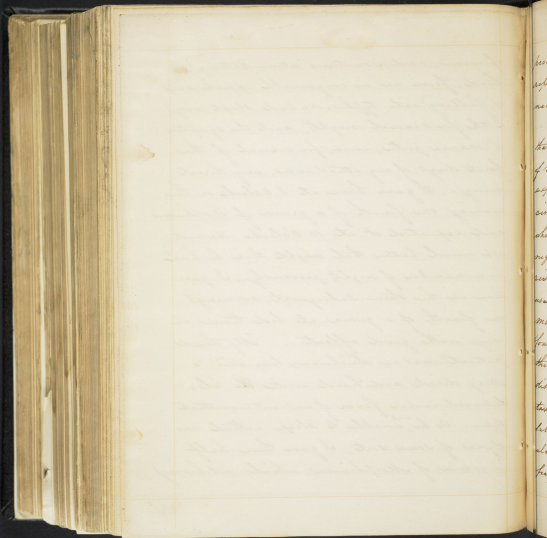
One gentleman has
politely furnished me with notes of
three cases "1st a Frenchman labouring
under intermitte fever. He had long
accustomed himself to the free use of
strong drinks, and owing to the depleting
course which his disease demanded,
he was strongly threatened with deli-
rium tremens. The fullness and activity
of his pulse, and the unpleasant in-



fluency of Opium on his constitution rendered it obviously improper; and the restlessness and total inability to sleep which had tormented him for forty eight hours rendered repose by some means indispensable. Under these circumstances I gave him one fourth of a grain of Morphin every hour, until he took three fourths of a grain. He then became composed and enjoyed a comfortable night's sleep all his symptoms became ameliorated, and I had no occasion to repeat the dose". The second case was an English gentleman whose constitution was greatly impaired by too great indulgence both in drinks and meats. He had been ill of fever of a slow remittent type for two weeks before my seeing him; and had indulged, more or less, during that whole period, in an occasional glass



of wines, and sometimes stimulating
foods, from an unconquerable apprehension
of falling into typhus, he had slept very
little for several nights, and the symptoms
of malarious fever, were, for several of the
first days of my attendance, very threat-
ening. I gave him at 8 o'clock on this
evening one fourth of a grain of Morphine
and repeated it at 10 o'clock. He rest-
ed much better that night than he had
for a number of nights previously. I gave
him on the three subsequent evenings
one fourth of a grain at bed time, al-
ways with good effect. My third
patient was an Irishman, long used to
strong drink and hard work, he also
laboured under fever of an intermittent
type. As he ^{was} unable to sleep without one
-dram of some sort, I gave him half
a grain of Morphine, which, not having

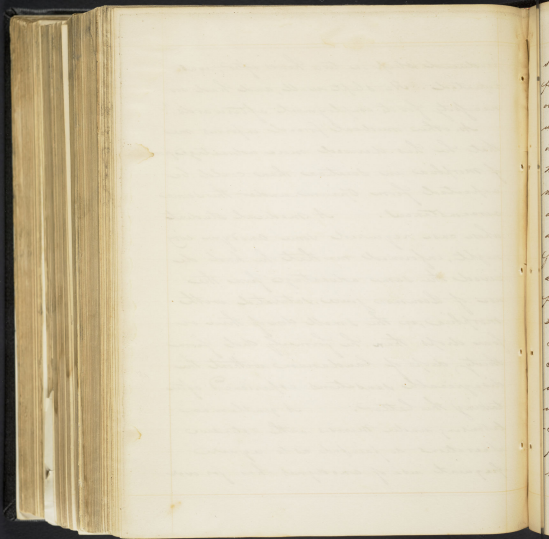


produced sleep in two hours after, was repeated. He slept well, and had no necessity for its employment afterwards."

An other medical friend informs me that he has derived more advantage from the use of morphia in sciatica than could be expected from Opium under the same circumstances.

A medical student whose case required some anodyne every night, informed me that he had derived the same advantage from the use of Lemon juice, saturated with morphia, in the small dose of three or four drops, than he formerly did from thirty drops of laudanum without the disagreeable sensations experienced after taking the latter.

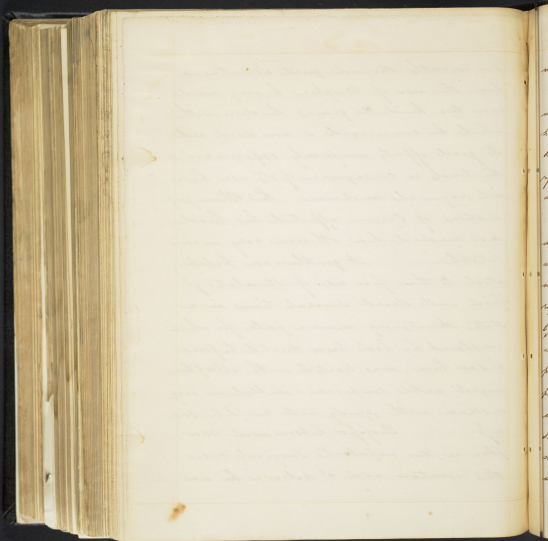
A gentleman labouring under Mercuris with extensive ulcerations so painful as to require frequent use of anodynes has for over



six months derived great advantage from the use of Morphine having used over two hundred grains the dose with which he commenced is now used and its good effects uniformly experienced. the bowels in consequence of its use have not required medicine, the other preparations of Opium affected his head and rendered him otherwise very uncomfortable -

A gentleman habituated to the free use of stimulating food and drink several times in a state threatening mania potus, for which complaint he had been treated before I saw him, was treated with Morphine, until composure resulted, in every instance with speed and complete success.

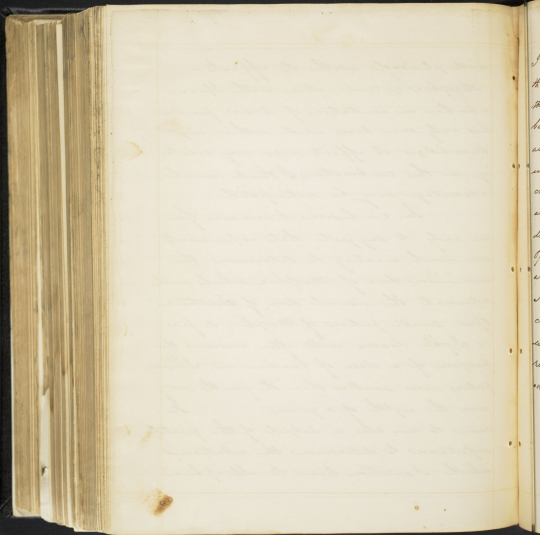
Professor Gibson used Morphine in two important surgical cases this winter and I believe he was



well pleased with its effects-

Morphia in combination with Ipecacuanha in imitations of Dover's powder has only once been used within my knowledge its effects were very salutary in this combination I think much advantage may be anticipated.

In conclusion it remains for me only to suggest that experiments are much wanting to determine the minimum dose of Morphia which will represent the usual dose of *Sinatura Opii*, small portions of Morphia so far as I can learn will often answer the purpose of a dose of Laudanum. Smaller portions even smaller than the fourth or even the eighth of a grain. It seems to me also a subject of the greatest importance to determine the relation which Narcotism bears to Morphia



I shall not be surprised to learn
that its character widely differs from
the description drawn by M. Magendie
being perhaps a comparatively harmless
associate with Morphia resembling
in some degree the relations of Ca-
chouin and Brucein with their associ-
ates. This view if correct will not
destroy the utility of the De Narcotised
Opium this preparation is well known
and highly commended Arthur besides
Narcotine removes a variety of substan-
ces from Opium more soluble in it than
even that substance perhaps to their
removal may be attributed its acknowl-
edged superiority over the common Opium.

